



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,809	11/09/2005	Hiroshi Ichikawa	52433/789	8919
26646	7590	09/06/2007		
KENYON & KENYON LLP ONE BROADWAY NEW YORK, NY 10004			EXAMINER MCNELIS, KATHLEEN A	
			ART UNIT 1742	PAPER NUMBER
			MAIL DATE 09/06/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,809	<b>Applicant(s)</b> ICHIKAWA ET AL.	
	<b>Examiner</b> Kathleen A. McNelis	<b>Art Unit</b> 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 6-17 and 21-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/26/06, 3/30/07, 5/31/05</u> . | 6) <input type="checkbox"/> Other: _____  |

### Claims Status

Claims 1-25 are presented for examination where claims 24 and 25 are withdrawn.

### *Election/Restrictions*

Applicant's election with traverse of Group I in the reply filed on 07/30/2007 is acknowledged. The traversal is on the ground(s) that the application is a national stage (371) of a PCT therefore PCT unity of invention rules apply. The claims are directed to a method and apparatus for carrying out the invention, therefore there is PCT unity of invention, see 37 C.F.R. 1.475(a)(4). Examiner believes the intended citation was 37 C.F.R. 1.475(b)(4), since 37 C.F.R. 1.475(a) does not have a subsection (4) and since 37 C.F.R. 1.475(b)(4) addresses unity of invention for process and apparatus claims.

This is not found persuasive because the restriction requirement was based on lack of unity of invention as provided in PCT Rules 13.1 and 13.2 (see 09/09/2007 Office action). Although 37 C.F.R. § 1.475(b)(4) lists a process and apparatus for carrying out the process as one of the categories where unity is possible, this does not mean that the two categories (process and apparatus) automatically have unity of invention. The restriction is based on there being no corresponding special technical feature linking the process and apparatus as required by PCT Rule 13.2 and as discussed in the 07/09/2007 Office action. PCT Rule 13.2 is as follows:

#### *13.2 Circumstances in Which the Requirement of Unity of Invention Is to Be Considered Fulfilled*

Where a group of inventions is claimed in one and the same international application, the requirement of unity of invention referred to in Rule 13.1 shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

The requirement is still deemed proper and is therefore made FINAL.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 6-17 and 21-23 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, and cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 6-17 and 21-23 not been further treated on the merits.

Claim 6 depends from any of claims 1-5, where claim 5 is a multiple dependent claim.

Claim 7 depends from any of claims 1-6, where claims 5 and 6 are multiple dependent claims.

Claim 8 depends from claims 1, 2 and 5-7 where claims 5-7 are multiple dependent claims. Further, multiple dependent claims should refer to other claims in the alternative only.

Claim 9 depends from claims 3, 4 and 5-7 where claims 5-7 are multiple dependent claims. Further, multiple dependent claims should refer to other claims in the alternative only.

Claim 10 depends from claim 8, which is a multiple dependent claim.

Claim 11 depends from claim 9, which is a multiple dependent claim.

Claim 12 depends from any of claims 1-11, where claims 5-11 are multiple dependent claims.

Claim 13 depends from claim 12, which is a multiple dependent claim.

Claim 14 depends from claim 13, which is a multiple dependent claim.

Claim 15 depends from any of any of claims 1-14, where claims 5-14 are multiple dependent claims.

Claim 16 depends from any of any of claims 1-15, where claims 5-15 are multiple dependent claims.

Claim 17 depends from any of any of claims 1-16, where claims 5-16 are multiple dependent claims.

Claim 21 depends from any of any of claims 18-20, where claim 20 is a multiple dependent claim.

Claim 22 depends from any of any of claims 18-21, where claims 20 and 21 are multiple dependent claims.

Claim 23 depends from any of any of claims 18-22, where claims 20-22 are multiple dependent claims.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 0142516

[based on text of U.S. Pat. Family member Ibaraki et al. (U.S. Pat. No. 6,755,888)].

Ibaraki et al. discloses a method for reducing a moisture rich powdery raw material (abstract), where the powdery raw material contains a metal oxide including electric arc furnace (EAF) dust mixed with a carbon-containing powder (col. 7 lines 14-35). The metal oxide is reduced in a rotary hearth reducing furnace (col. 7 lines 5-18). Although not specifically recited in Ibaraki et al., EAF dusts contain alkali metals and halogen elements; therefore such would be expected to be present in the EAF dust disclosed by Ibaraki et al. Ibaraki et al. discloses the

addition of water and mixing to form a slurry (col. 7 lines 14-52), then dehydration of the slurry by means such as a filter press (col. 7 line 64- col. 8 line 12).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 0142516 [based on text of U.S. Pat. Family member Ibaraki et al. (U.S. Pat. No. 6,755,888)].

Ibaraki et al. is applied as discussed above regarding claims 1 and 3.

Ibaraki et al. does not specifically recite that EAF dust and carbon powder is mixed with another feed material.

In Examples 1 and 2, Ibaraki et al. discloses mixing powdery ore with coke breeze and blast furnace gas sludge (col. 14 lines 50-56), therefore the addition of powdery ore to the mixture of EAF dust and carbonaceous reductant would have been an obvious modification to one of ordinary skill in the art at the time the invention was made. Further, Ibaraki et al. discloses that the method has equal utility for metal oxides including finely divided iron ore, EAF dusts, blast furnace gas sludge, basic oxygen furnace dusts, neutral sludge or mill scale (col. 7 lines 14-30), therefore the combination of any of these materials would have been an obvious modification to one of ordinary skill in the art at the time the invention was made (See M.P.E.P. 2144.06).

Claims 1-4 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 2002-194452 (JP '452)<sup>1</sup> in view of Rinker et al. (U.S. Pat. No. 5,873,925).

With respect to claims 1-4 and 18-20, JP '452 discloses a method for treating electric arc furnace (EAF) dust with recovery of zinc (abstract) where the dust is mixed with water to dissolve chlorine (paragraph 0005). The resulting mixture (i.e. slurry) is dewatered by filtration means such as filter press or centrifugal press (paragraph 0006). Such pressing would dehydrate the charge material. Although not specifically recited in JP '452, EAF dusts contain metal oxides, alkali metals and halogen elements; therefore such would be expected to be present in the EAF dust disclosed by JP '452. In an example, JP '452 discloses mixing the EAF dust with water, dehydrating in a filter press to form a cake of about 20 wt% moisture, adding iron powder,

alumina cement, stirring and kneading followed by granulation with an extrusion mold granulating machine (paragraph 0022).

JP '452 discloses that reduction is performed in a heat treating furnace, and lists a rotary kiln as an example of such furnace (paragraph 0017).

JP '452 does not disclose that the material is charged to a rotary hearth type reduction furnace for reduction.

Rinker et al. discloses a method for treating iron -bearing materials and a carbonaceous material to form a mixture, then agglomerating the mixture and heating in a furnace to reduce the iron oxides in the iron bearing material to elemental iron (col. 2 lines 11-35), where the iron bearing material includes EAF dust (col. 1 lines 53-60). Rinker et al. teaches that a rotary hearth furnace is the functional equivalent of a rotary kiln furnace in this application (col. 5 lines 8-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the pellets of JP '452 in a rotary hearth furnace since JP '452 uses a rotary kiln as an example of a suitable furnace and Rinker et al. teaches that rotary kiln and rotary hearth furnaces are substitutes in the same field of endeavor (See M.P.E.P. 2144.06).

With respect to claims 3 and 4, JP '452 further discloses the addition of iron powder containing carbon (Table 2 and paragraph 0022) and Rinker et al. teaches the addition of carbonaceous material to the pellets as a reductant (col. 3 line 36 – col. 4 line 41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add carbonaceous material as taught by Rinker et al. to the pellets of JP '452 since Rinker et al. teaches that such addition assists in reduction and reduction is desired in JP '452.

---

<sup>1</sup> Based on machine translation to English

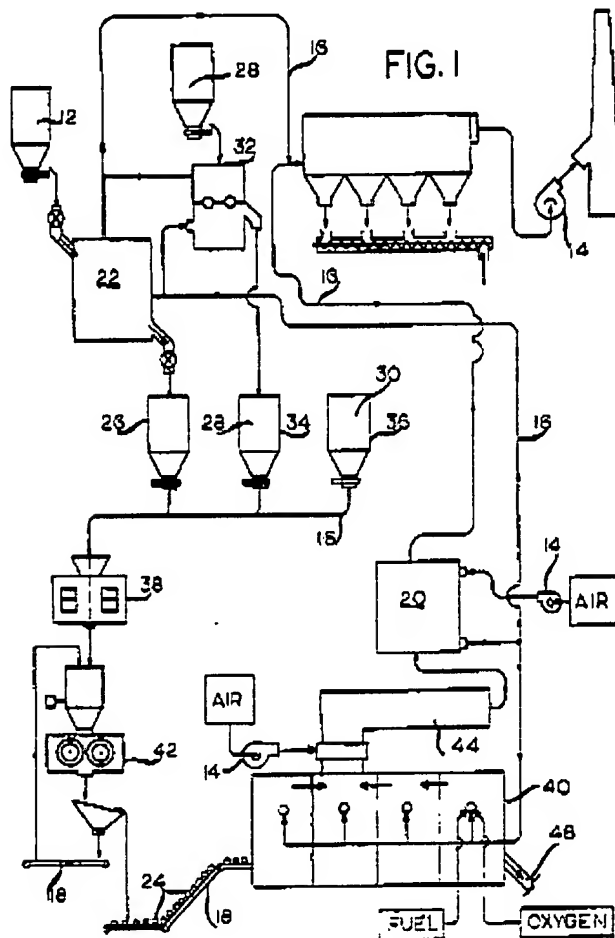


With respect to claims 18 and 19, JP '452 discloses a method for treating electric arc furnace (EAF) dust (i.e. a steelmaking waste) with recovery of zinc (abstract) where the dust is mixed with water to dissolve chlorine (paragraph 0005). The resulting mixture (i.e. slurry) is dewatered by filtration means such as filter press or centrifugal press (paragraph 0006). In an example, JP '452 discloses mixing the EAF dust with water, stirring at a rotational speed of 1 rpm, then pressing in a filter press to form a cake of about 20 wt% moisture, adding iron powder, alumina cement, stirring and kneading followed by granulation with an extrusion mold granulating machine (paragraph 0022). Lacking further definition or limitation of "concentrating the mixture to produce a slurry", the stirring step of JP '452 concentrates the mixture to produce a slurry. The mixture is obviously a slurry, since filter pressing results in a filter cake. With respect to claims 18-20, alumina cement would be expected to adjust the pH, since alumina cement comprises bauxite ( $\text{AlO}(\text{OH})$ ) and limestone.

JP '452 does not disclose that the material is charged to a rotary hearth type reduction furnace for reduction or recovery of secondary dust containing zinc oxide from the rotary hearth furnace (claims 18 and 19).

Rinker et al. discloses a method for treating iron -bearing materials and a carbonaceous material to form a mixture, then agglomerating the mixture and heating in a furnace to reduce the iron oxides in the iron bearing material to elemental iron (col. 2 lines 11-35), where the iron bearing material includes EAF dust (col. 1 lines 53-60). Rinker et al. teaches that a rotary hearth furnace is the functional equivalent of a rotary kiln furnace in this application (col. 5 lines 8-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the pellets of JP '452 in a rotary hearth furnace since JP '452 uses a rotary kiln as an example of a suitable furnace and Rinker et al. teaches that rotary kiln and rotary hearth furnaces

are substitutes in the same field of endeavor (See M.P.E.P. 2144.06). Rinker et al. discloses treatment by collection of emissions from the reducing furnace (40), cooling by heat exchangers (20) and routing (16) to a dust collector (unnumbered element directly under "Fig. I" on Figure 1), where collection of zinc oxides would be expected.



With respect to claim 18, JP '452 discloses the addition of iron powder containing carbon (Table 2 and paragraph 0022) and Rinker et al. teaches the addition of carbonaceous material to the pellets as a reductant (col. 3 line 36 – col. 4 line 41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add carbonaceous material as taught

by Rinker et al. to the pellets of JP '452 since Rinker et al. teaches that such addition assists in reduction and reduction is desired in JP '452.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 2002-194452 (JP '452) in view of Rinker et al. (U.S. Pat. No. 5,873,925) as applied to claims 1-4 and further in view of Pickles (1997).

JP '452 in view of Rinker et al. is applied as discussed above regarding claims 1-4.

JP '452 does not recite that the mixture contains a total of at least 0.1 mass% of alkali metals and halogen elements.

Pickles presents a summary of analysis of EAF dust composition, and in Table II, p. 6 lists the mean composition of EAF Dusts compiled from sources in the U.S., France and Spain. In all case, dusts contained Na (i.e. alkali metal) and chloride (i.e. a halogen) at a composition within the range of at least 0.1 %. Since JP '452 in view of Rinker et al. discloses treatment of EAF dust, and since Pickles teaches that such dust contain at least 0.1 mass% of alkali metals and halogen elements, dust containing at least 0.1 mass % alkali metal and halogen is within the scope of disclosure of JP '452 in view of Rinker et al.

#### **Additional Citations**

The following reference is provided as evidence of the compositions of typical electric arc furnace dust:

Pickles, Chris "Recent Research in EAF Dust Processing", Steel Mill Wastes and By-Products, June 2-4, 1997, Table II, p. 6 lists the Mean composition of EAF Dusts compiled from sources in the U.S., France and Spain. In all case, dusts contained K and Na (i.e. alkali metals), chloride (i.e. a halogen), zinc and lead. Table III p. 10 discloses that the metals are present as oxides.

The following reference is provided as evidence that alumina cement comprises limestone and bauxite:


Dourdounis et al., "High-alumina cement production from FeNi-ERF slag, limestone and diasporic bauxite", Cement and Concrete Research, 34 (2004) 941-947.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571 272 3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAM   
08/30/2007

  
ROY KING  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700